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MCZ newsletter

MUSEUM OF COMPARATIVE ZOOLOGY

Dr. Hu Shiu Ying to Lead China Trip

Botanist Hu Shiu Ying of Harvard's Arnold Arboretum will introduce travelers to the natural wonders of her native China on the MCZ's first foray into China next April 28 to May 21.

Dr. Hu arrived in the United States in 1946 with a fellowship grant from Radcliffe College for graduate work in botany. She received her Ph.D. in 1949 and has been working at the Arnold Arboretum ever since, curating the half-million specimens that constitutes the Chinese collections in the Herbarium. She was Chief Botanist on the Flora of China Project between 1953 and 1957; together with three other botanists and assistants, she prepared a complete index to the flowering plants of China. In 1968 she started a project on the Flora of Hong Kong, staying in Hong Kong for four years and collecting 12,000 sets of specimens. She has also taught at the Chinese University in Hong Kong.

From 1979 to 1984 Dr. Hu was invited by the Chinese government and academic institutions to give lectures and short courses in botany throughout the country. She is the author of over 150 scientific publications and several books including *Wildflowers of South China* and *Wildflowers of Hong Kong* with artist Beryl M. Walden.

Dr. Hu is thoroughly familiar with all the areas to be visited on the expedition and her extensive academic associations will provide opportunities for informal meetings with local researchers.

New Itinerary: Australia in Depth

There is still time to join Australian veterans Randy and Molly Olson on a specially-designed trip to their favorite natural history haunts. For complete information, contact the Public Programs Office at 617-495-2463.

Molly and Randy Olson

China — A New View

The MCZ's joint expedition with the Massachusetts Audubon Society will emphasize plants and birds and will focus in depth on three quite different habitats: the tropical forest of the southwest, where there is also a chance to see elephants and monkeys; the mountainous Wolong reserve at the edge of the great Tibetan plateau, home to the elusive giant panda; and the marshes of Zhalong in the northeast, where there is a chance of seeing the endangered Siberian crane.

The cultural aspects of the remote areas to be visited are also fascinating. "People might think they have seen all there is to see in China after visiting the cities. However, there is a China you would never believe still exists and this trip takes us there." Ray Ashton of Massachusetts Audubon Society, who has just returned from a whirlwind trip to China viewing the areas to be visited on our joint expedition also remarked on the hill people in the southwest. "They still wear their traditional clothing and live in villages that haven't changed in centuries. They have had little or no contact with westerners and were full of wonder at their visitors from the United States."

An optional one-week extension to see the cultural sights of Beijing and Xian is offered. Call the Public Programs Office at 617-495-2463 for complete information.

Patterns of Lives in Science: E. O. Wilson

by Hilary Hopkins

Edward O. Wilson loves many things. I heard delight reflected in his spirited voice as he showed me round the ant habitats, arrayed along the walls of his office, during a recent visit. After this too-brief token visit to the Queendom of the Ants, we spoke of other things he loves.

He's a lover of words and of image and metaphor. A very large dictionary rests on a stand in his office, in a place of honor by the ants. "If by some horrible chance, you were not able to do science, what work would you want to do?" I asked.

"I'd be a writer!" The response came instantly and decisively. "I'm a Southern writer who got detoured into science. I have the instincts of a writer. But given a choice, I would always have taken science, so I'm happy where I am."

As we talked about good teachers he'd had in his early years, it became apparent that his love of words and writing appeared, and was recognized, early on. "I had several teachers of English who encouraged my writing. The Southern schools have probably been undervalued in what they've done for students—I'm speaking now about my generation. Far from being uncultured, many of these small-town schools often had superb teachers, who worshipped literature, and encouraged any writing ability they saw in youngsters. Yes, my English teachers," he ended with admiring fondness.

Professor Wilson mused on the use of words in his own teaching. "The student is a taskmaster, who brings you back to basic questions and forces you to express yourself with precision."

Wilson has a rich treasury of words and images to describe his work. He showed me some of the elegant drawings he is making for a new book on ants. "Bert Holldobler and I are doing an encyclopedic book on ants. Among other things, we're going to illustrate every one of the 300 genera. I enjoy the fine detail of the work—it's like gardening, like trimming bonsai trees—gives instant, restful feedback."

Photo by Lilian Kemp

E. O. Wilson

Later I considered how the bonsai tree is intended as a little world of its own, a miniature of the larger world, yet perfect in itself. Wilson's words about the ants echoed in my mind: "To the average person, these things are nothing but tiny tiny bits of chitin running around, each one a millionth the size of a human being. But when you get them under high magnification, you see that each is like a little world unto itself. It is an object of endless beauty." I see how apt his metaphor has been. He finds unforeseen revelations in the object of his devotion.

A writer, or a teacher, uses words to illuminate both an inner vision and the outer world. E. O. Wilson is also a lover of place, and he has written eloquently of places sacred to him. I asked if he had returned to the favorite places of his Southern boyhood, about which he wrote in *Biophilia*. "Yes, I have, repeatedly. I've gone back in the last ten years several times and visited the place where I used to catch snakes. It's magnetic, I keep going back, mostly to dream and recapture the feelings I once had. *Biophilia* was partly my 'Southern writer's' book. It was an attempt to encapsulate and preserve, to my satisfaction, the experiences that I had in the South, which I perceived as a gateway to the tropical environment. The sense that the tropics themselves were Northern Florida and Southern Alabama writ large, as far as natural history was concerned, is a compelling image."

"My families, on both sides, were typical Alabamian, family oriented 'tribes,' going back to the 1830's. Maybe I'm one of the few members of the Harvard faculty who can go into a Gulf Coast oyster bar and spend the afternoon without being noticed. I take a certain pride in that," he smiled.

Wilson spent a peripatetic childhood, attending sixteen schools in eleven years. But the natural world of the South was in a sense a permanent "place" with which he was familiar no matter in which part of it he happened to find himself. As he recollected his very earliest experience in science, I felt I was hearing about the beginning of a Quest, the first steps upon the trail, for Wilson loves not only words and places, but also, perhaps, being on the trail.

"When I was nine years old, I had this childish dream of going on expeditions—I don't know, maybe I saw a Frank Buck movie—but I somehow got the idea of going out and collecting creatures in the wild, which in this case turned out to be Rock Creek Park. I brought back specimens and started making collections when I was about nine years old. That soon grew into a love of butterflies, and also a love of ants, which didn't develop decisively until the ripe old age of thirteen. I think a great many children have a bug episode when they're about nine or ten. I just never grew out of mine."

These first steps on the trail led outward into what Wilson describes in *Biophilia* as "eclectic endeavors . . . a thick tangle of studies." "Comparison and synthesis are the main themes of my scientific career," he told me.

I mentioned that he's described himself as a workaholic; to me that suggested a person who has a passion to know as much as possible, now.

"That's right," he responded. "And to get as much control of things as possible. It's an acquisitive drive. I don't mean in a dominating sense, but in the sense of mastering your own environments."

He went on: "You choose, as your personal muse, a group of organisms; you become devoted to it. It can be a single organism—a single species of antelope or butterfly or whatever—that you adore in every

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Hilary Hopkins, a Friend of the MCZ since 1981, is a science enthusiast and educational consultant specializing in gifted children. This article is the fifth of a series she has prepared for the MCZ Newsletter.

Spring Chicken?

As many heard on the *ABC News*, saw on the *Today* show, or read in *Science* magazine, Professor Farish A. Jenkins, Jr., in conjunction with Drs. Kenneth Dial and G. E. (Ted) Goslow, has discovered something that puts a new twist on an old snap—the wishbone.

By filming European starlings fly in a specially constructed wind tunnel with a high-speed x-ray technique known as cineradiography, Jenkins' research team was able to see that the wishbone is not merely a strut or brace, as previously thought, but acts as a spring. This is the first time researchers have watched directly the movements of a bird's shoulder girdle as it flew. Each of the upper ends of the U-shaped wishbone in the starling is attached to one of the bird's shoulders while the lower end is not directly attached to any other part of the skeleton. During the wing's downstroke the ends of the wishbone are pulled apart to nearly one-and-a-half times their resting width, making this one of the most elastic bones found in any vertebrate.

Since the skeletal structure of the European starling is typical of many birds, it can be assumed that the spring action of the wishbone is fairly common, but what is the function of this action?

The researchers hypothesize that the spring action of the bone is related to internal respiration. The starling has air sacs both between the halves of its wishbone and in the abdomen. The spreading of the wishbone with a downstroke of the wing may cause expansion of the sacs between the bone; at the same time the sternum presses up against the air sacs behind the wishbone. On the upstroke this double bellows action is reversed.

The original goal of this research was to understand exactly how the musculoskeletal system of a bird's shoulder worked. Paleontologist Jenkins hopes that by understanding how the birds' structures, like the wishbone, reflect their function he will gain insight into the evolution of these structures. So far this study has indicated that the wishbone-sternum system in the European starling seems to have evolved in part to link the flight and respiratory functions of the bird.

The public announcement of this exciting discovery using new techniques will sound familiar to our *Friends* who attended the spring 1987 open house in Vertebrate Paleontology. The wind-tunnel was demonstrated, the x-ray films shown, and the evening really took off with Dial's impersonation of a European starling.

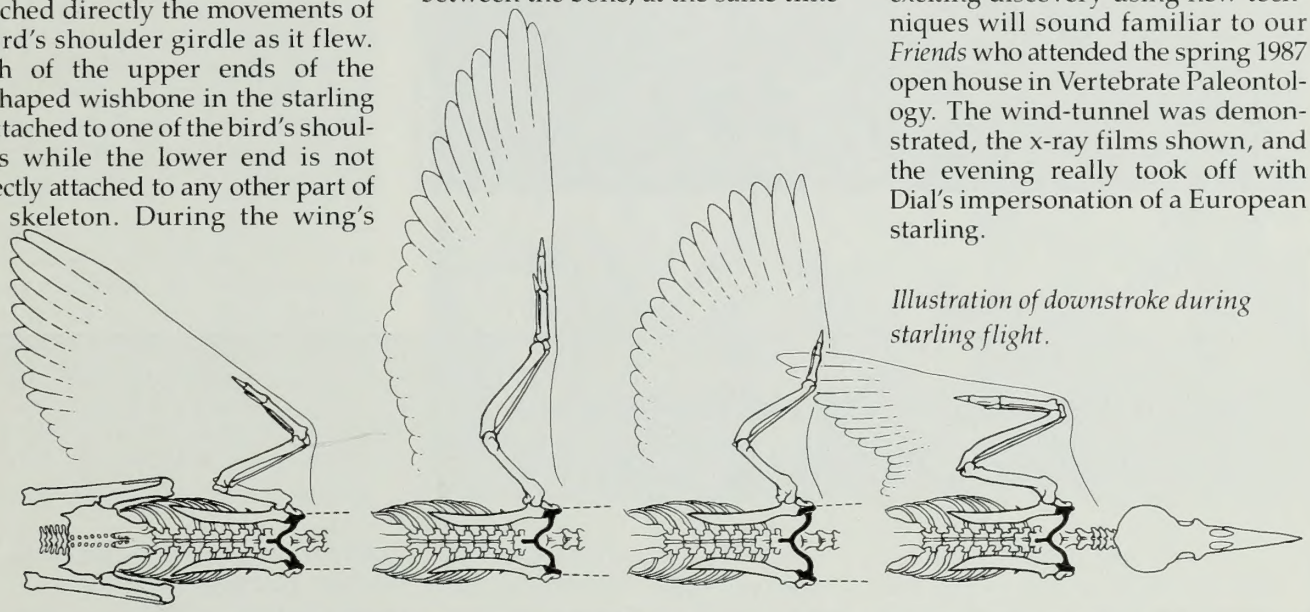

Illustration of downstroke during starling flight.

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respect. You wish to know everything there is to be known about it. In the course of this obsession, you realize that you are a scientist, you have a craving to make discoveries, so you take the organism you're working with and you pick the problem that you feel your organism is best at solving. That's the kind of scientist I've tried to be, a naturalist steward. I've tried to see what the ants can provide to science."

The trail of discovery leads far afield into a wondrous tangle ahead. Mastery of the trail requires both comparison and synthesis, each informing the other. But Wilson is confident about the home base from which the quest draws its vitality. He wrote elsewhere: "The ants gave me everything, and to them I will always return, like a shaman reconsecrating the tribal totem . . . Every creative person carries an innermost image of the routes of imaginative pursuit to which he returns for a strength independent of praise and human influence . . . My ultimate retreat is in the natural world through which we are privileged to travel . . ."[1]

I looked around his office. There lay the big dictionary, symbol and resource of the lover of words. On the walls were images of loved places and heroes in science. And surrounding all, the ants, living with awesome unconcern for those who admire them, little worlds unto themselves. "You know," Professor Wilson said, "there's a kinesthetic satisfaction that comes from working with these organisms, a touch that leads to a smell and then to an image, so that all the senses are roused through a circle. 'Synesthetic' is the word for it."

"What's that word?" I asked.

"'Synesthetic.' It means imagery based upon the blending of multiple senses." He laughed. "You know," he said, "I believe I could close off all the portals. Agree with Walt Whitman that nature is the beginning and end of passion. Return to the ants and the natural world they represent so well. But I've made a lot of commitments—including interviews. With all due respect," he added courteously.

1. "In The Queendom of the Ants: A Brief Autobiography" in Donald A. Dewsbury (ed.) *Leaders in the Study of Animal Behavior: Autobiographical Perspectives*, pp. 465, 483. (Cranbury, NJ: Bucknell University Press, 1985).

South America a Hit with MCZ Travelers

by Gabrielle H. Whitehouse

Photo by George G. Whitehouse

Iguassu Falls.

Among the highlights of an exceptionally varied and stimulating natural history trip to Brazil and Argentina in October were close sightings of Southern right whale mothers and their calves, brooding Magellanic penguins in their burrows, dozens of guanacos, rheas with their young, and 17 Andean condors circling overhead. The group also traveled through a variety of dramatic settings including the peaks and beaches of Rio de Janeiro; Iguassu, the world's widest waterfalls with over two-and-a-half miles of cataracts; Ushuaia, the world's southernmost city (according to the Argentinians—the Chileans make the same claim for Punta Arenas) situated in rugged Tierra del Fuego; Perito Merino, one of the world's few growing glaciers, constantly cracking and calving into the glacier lake; and gusty Peninsula Valdes, where the wind was clocked at 102 miles per hour on the first day of our stay.

Natalie Goodall—Whale Researcher at "The Uttermost Part of the Earth"

Rae Natalie Prosser Goodall is an American woman who has made her home with husband Thomas Goodall on Estancia Harborton in remote Tierra del Fuego for the last 25 years. Her husband is a great grandson of Thomas Bridges, author of *The Uttermost Part of the Earth*. In 1886, Bridges founded Estancia Harborton, the first estancia (or ranch) established in Tierra del Fuego. A botanist by training with an extensive collection of local plants, Natalie Goodall is also the author of the definitive guide to Tierra del Fuego. Her most involving activity, however, has been the collecting and studying of whale bones which she has found on the estancia's stretch of beach along the Beagle Channel.

Goodall's comprehensive whale bone collection includes partial and complete skeletons of baleen and toothed whales and several dolphins. What makes her collection unique, however, is the large number of bones of the rare, elusive beaked whales she has assembled. One of the prizes of the collection, the skeleton of the seventh known specimen of Hector's beaked whale, is neatly arranged on one of the living room beams in her house in Ushuaia.

Little is known about beaked whales because they do not mate in shallow lagoons, like some great whales, because they are cosmopolitan rather than restricted to a particular feeding ground, and because they do not gather in large numbers like pilot whales. Consequently, there is very little data on living beaked whales, and specimens of beached ones are rare.

Goodall's contribution to whale taxonomic studies is widely recognized. She travels to the United States to attend share her findings at marine mammal meetings whenever possible. Overcoming the obvious obstacles of her remote location and lack of adequate research support, she continues in her work, sometimes assisted by students and other researchers. Together with her husband, she is now welcoming visitors to Estancia Harborton, in the hope that this will lead to a greater awareness of the importance of her research.

Perito Merino glacier.

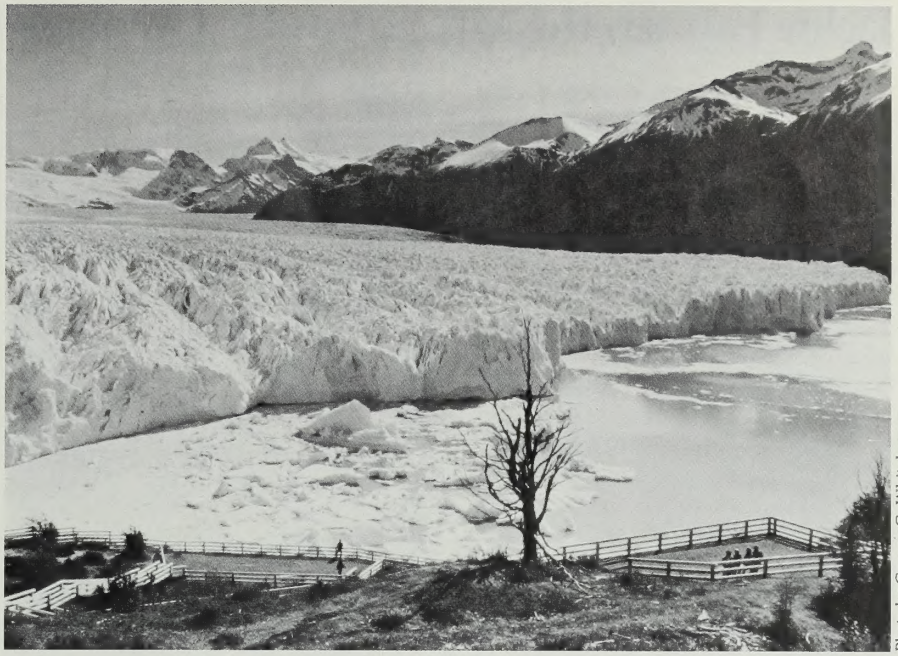

Photo by George G. Whitehouse

We were fortunate to have several unusually qualified and able guides to introduce us to the wonders around us. Roger Payne, whose Long Term Research Institute was the co-sponsor of this venture, joined us for our stay in Peninsula Valdes and took us on a visit to his whale research camp, which allows a vantage point to view the right whales as they travel along the beach. Research associate Vicky Rowntree was on hand to focus spotting scopes on the approaching whales. Payne also accompanied us on a spectacular three-hour whale watch in the sheltered lagoon near Peurto Pyramides, where we were surrounded by mothers and calves cavorting and observing us with seemingly great interest. Payne was joined by Carol Mackie de Passere, an accomplished guide to the Peninsula Valdes, whose retelling of her personal experience of having lived, together with her park ranger husband and three young children, at Punto Tumbo, nesting site for more than 600,000 Magellanic penguins, made our visit particularly memorable.

In Tierra del Fuego we were privileged to meet and learn from Natalie Goodall who invited the group to examine her whale bone collections

Photo by Gabrielle H. Whitehouse

Pilot whale skulls in the back yard—part of Natalie Goodall's whale bone collection.

Photo by Gabrielle H. Whitehouse

Naturalist Michael Ellis and whale researcher Natalie Goodall.

in her laboratory in Ushuaia's modern research center and also at her Ushuaia home.

Throughout the entire adventure we were escorted and tutored by Michael Ellis, a California naturalist with a great flair for teaching and a keen interest in people, the origins of words, and trivia, as well as wildlife. As usual on these MCZ expeditions, the participants added their individual flavor to the blend of personalities and, in this case, with exceptionally rich results. A photo exhibition by one member, Sean Palfrey, is planned for the MCZ Gallery next fall. This will give others the opportunity to enjoy this highly photogenic journey vicariously or perhaps it will entice them to travel south with the MCZ when this trip is offered again in 1990.

Jackie Palmer, the MCZ's Spider-Woman

Fifth-year graduate student Jackie Palmer is well on the way to completing her thesis on silk production in the primitive spiders. Using scanning electron microscopy, she is comparing the spinnerets and spigots of all 15 families of tarantulas and trapdoor spiders. Simultaneously she is examining the corresponding silk glands and fiber chemistry so as to identify new types of spider silks. The more advanced form of spiders and their silks have been studied more extensively and are much better known to science. In order to understand the origin and evolution of silk production, Palmer reasons, it is necessary to investigate the more primitive spiders which produce less specialized forms of (or "general purpose") silk. In the course of her survey, she has discovered a new form of spigots on the spinnerets of the California *Aptostichus* and plans to name them "pumpkinoform" spigots in recognition of their distinctly pumpkin-like shape.

Palmer's research has led her to look beyond the spinning apparatus to the chemical properties of the silk itself. The phenomenal strength of some spiders' silk is graphically demonstrated by its use by inhabitants of New Guinea to custom-spin their fishing nets. In some species the silk is stronger than steel and rivals the strongest synthetic thread.

Jackie Palmer with Agatha, a red-kneed tarantula

Her interest in spiders and their silk has led Palmer to explore beyond her scientific investigations into the rich mythology that spiders have inspired and to the practical uses beyond fly-catching of their remarkably strong yet elastic product. She has published an article, "Spiders: Masters of Natural Textiles" in *Fiberarts, The Magazine of Textiles*. A second article dealing with spider silk and webs in religion, mythology, art, technology and medicine has been submitted to *Threads*.

Most cultures have their spider lore, Palmer points out. Their scientific name, *Arachnida*, is derived from Roman mythology. According to the poet Ovid, the maiden Arachne challenged Athena, the goddess of handicrafts, to a weaving contest. Athena's envious rage when she viewed Arachne's superior tapestry led her to transform her competitor into the first spider. Other legends attribute the creation of the world to a spider. The Native Americans of the Southwest, for example, revere a being they call Spider Woman, believing that she gave birth to the two mothers who began the human race after being impregnated by a ray of sun.

Spider webs have inspired poetry, such as the moral emblem "Enter Not, or Pass Through" published in 1865 by Jacob Cats and Robert Farlie.

Both religious and secular paintings have been made using spider silk as the canvas. Historically, there was even a school of cobweb painting in Vienna. The only current American practitioner of cobweb painting

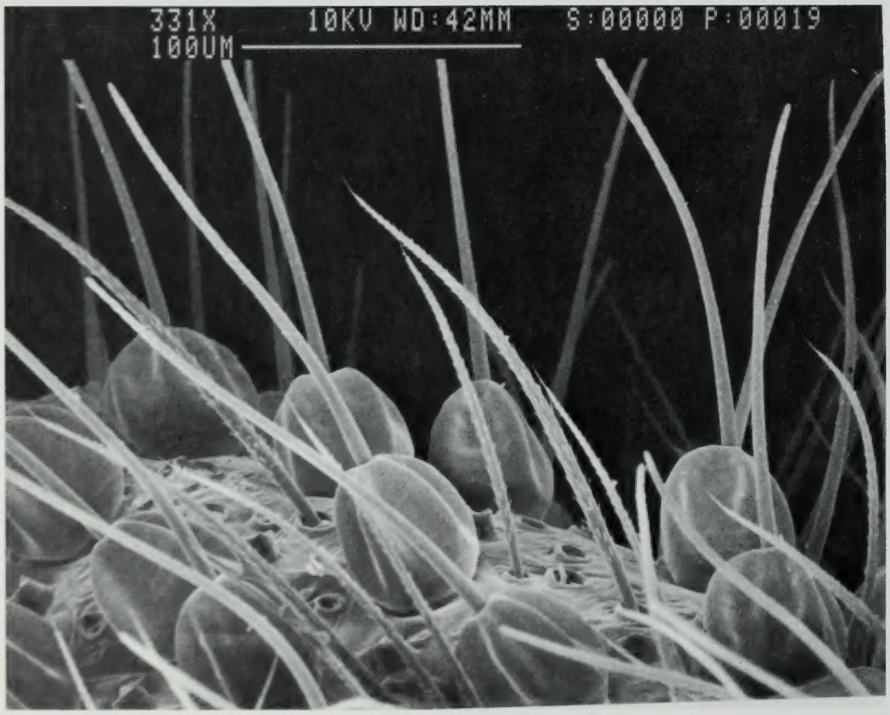

Photo by Jackie Palmer

"Pumpkinoform" spigots of the California spider, Aptostichus schlingeri. *Scale bar = 100 micrometers.*

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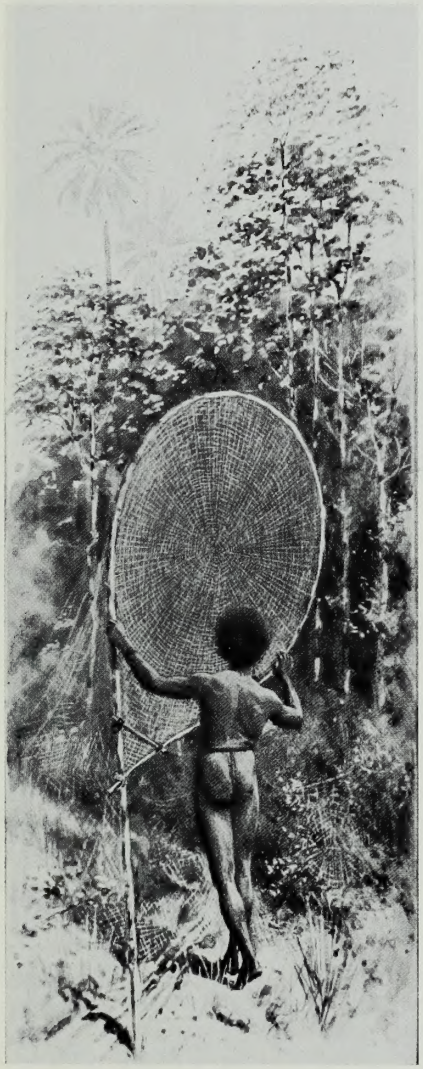
Editor: Gabrielle H. Whitehouse
Photographer: A. H. Coleman
Contributing writers: Jane Anderson, Alfred Alcorn

is 86-year-old Mrs. Mabel Wood of New York state who paints rural scenes and wildlife directly on spider webs or tent caterpillar nests stretched on cardboard frames.

A weaver herself, Palmer's admiration for her subject's proficiency has taken on a personal dimension. She has tried spinning the three-dimensional cloud of silk produced by her spider "employee" (genus *Ischnothele*) with a simple toothpick or pencil—more effective than a drop spindle. The process has turned out to be too difficult for mass production, but her goal is to wear a small article of clothing, perhaps a lace spider silk collar, to her thesis defense.



A SPIDER'S WEB AS A FISHING-NET: A STRANGE NEW GUINEA DEVICE.

A very huge and strong spider's web, common to New Guinea, is used by the natives as a fishing net. They set up in the forest a bamboo, bent as in the picture, and leave it until the spiders have covered it with a web in the manner shown.

From A. E. Pratt: *Two Years among New Guinea Cannibals*, Second Edition, Seeley & Co. Limited, London. 1906

From Moral Emblems *of Jacob Cats and Robert Farlie, by John Leighton, Longmans, Green, Reader and Dyer (London), 1865.*

Enter Not, or Pass Through

As the web spun by Spider's care,
T' entrap the flies and gnats which
fill the air,
So with th' entangling nets by
Venus laid
T' ensnare the hearts of heedless
youth and maid:-
For in the love net, as the Spider's
too,
The gnat is taken, but the Bee
breaks through.

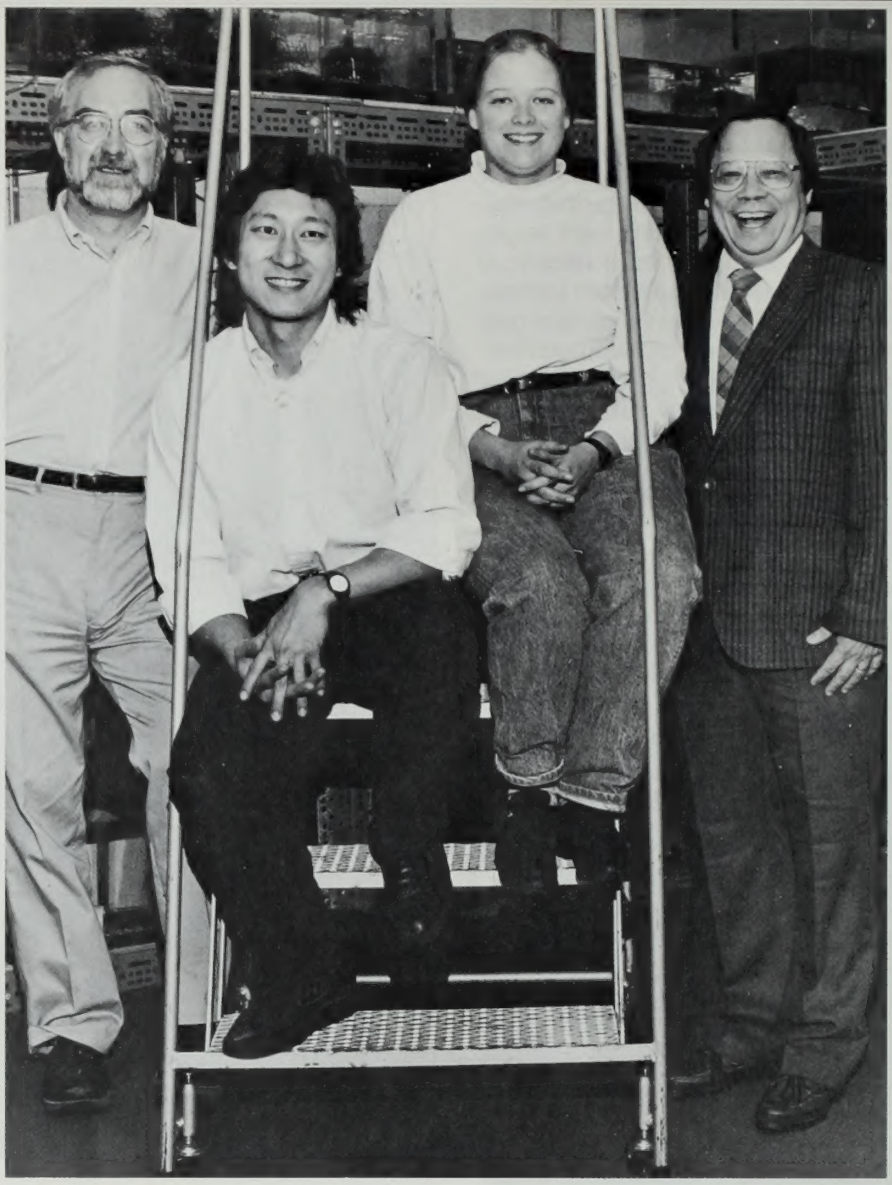
Hence, young folks, learn thro'
Venus' nets to break,
Nor let their flimsy meshes captive
take
Both heart and mind: Take pattern
by the Bee:-
Like him resist the loss of liberty;
Break boldly through; but if the
strength you lack,
Take my advice, and cleverly turn
back.

Denizens of the Fish Department

Diligent by day and night the denizens of the fish department, under the leadership of Karel F. Liem, Henry Bryant Bigelow Professor of Ichthyology, immerse themselves in the mysteries of the deep and shallow. Since Liem's arrival at the MCZ in 1972, a constant stream of graduate students and undergraduates, through their research projects in Liem's course on the Biology of the Fishes, have created a lively research atmosphere in the Fish Department. Liem has also made extremely important contributions to the MCZ through his supervision of a major renovation of the fish collections, a project for which he has received continuous National Science Foundation support since 1974.

Found in the labyrinthine basement of the old museum building are preserved remains of rare, extinct, and improbable fishes spanning vast geographical and chronological bounds. Curatorial Associate Karsten Hartel manages these world-class collections and has seen their number double to 800,000 as a result of his work with Liem on selectively upgrading the holdings. When he is not curating the collection, which is the first at the MCZ to be computerized, or serving on national collection committees, Hartel concentrates on local fishes. Dr. David Smith, one of the world's leading experts on eel-like fishes and their larvae, is working on an NSF funded project to develop an archival collection of larval fishes.

Live sharks, puffer fish, catfish, lungfish and eels dwell in the bubbling aquaria of the MCZ labs along with marine creatures so obscure even their common names are unfamiliar. These fish behave strangely and are watched closely by members of the lab who wonder, how do puffer fish puff?, why can catfish walk?, and how do sharks eat? Liem's research team is attempting, through asking questions such as these, to provide insights into the problem of how selection acts to produce interdependency among



Fish Department members (l. to r.) Karsten Hartel, Ernie Wu, Beth Brainerd, and Karel Liem

physical features allowing the fish to adapt to their present habitats and whether these adaptations then limit the fishes ability to survive under changed circumstances.

Liem has just been awarded a grant from the National Science Foundation to study development in surf-perch. The project will examine free-swimming larvae and offspring born fully mature to see what consequences the differences in selective pressure might have on the different types of broods. The research will compare embryos and larval juveniles at the same stage of development by measuring all features of the specimens from each group and then plotting cross-sectional information into a computer. This creates three-dimensional diagrams that can be easily manipulated and examined.

Graduate students Jeff Jensen and Ernie Wu are both investigating the evolution of feeding mechanisms.

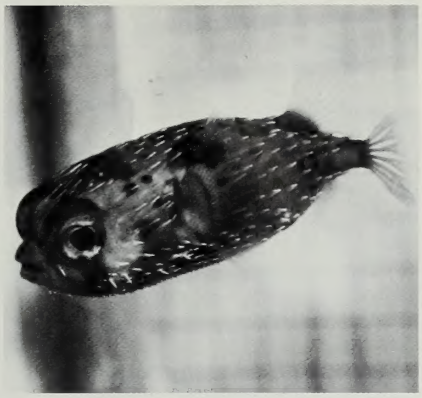
Jensen is working on a comprehensive description of feeding evolution of surf-perch from a systematic point of view. Through the use of high-speed video filming to examine movement during feeding and implantation of pressure transducers to see how suction is generated in feeding, Jensen will document structural and functional variation within the group. This information will be combined with ecological data to determine the relative roles hereditary or environmental factors play in shaping these patterns of variation.

Ernie Wu, using similar techniques, is documenting the evolution of feeding apparatus in sharks and rays, a major taxonomic group that has not been well studied with

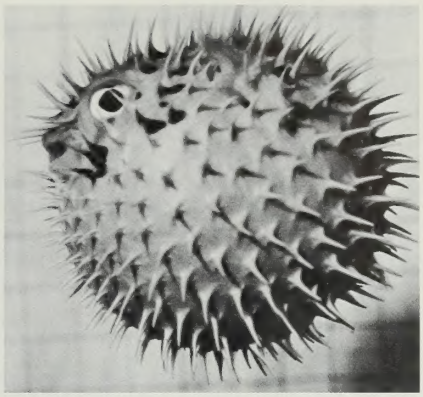
modern analytical methods. Wu is looking at the relationship between form and function, focussing on the functional role of hyostyly, (a condition where the jaw and cranium are connected by upper gill arches). This is a significant feature in the evolution of sharks and rays. Although the occurance of hyostyly is widespread in this group there is enough differentiation among members to provide a good model for studying diversification of a biomechanical system.

Beth Brainerd is working on fish in the order Tetraodontiformes, a morphologically bizarre group with very interesting defense behaviour. This group includes puffer fish with poisonous flesh and inflatable spine-covered bodies, trigger-fish with locking spines, box fish encased in armor, and the giant ocean sunfish with no tail that lolls along by flapping its long dorsal and ventral fins. The goals of her research are two-fold: to use the group to study historical (genetic) constraint in evolution by looking at why these fish are so extreme in their differences from all other reef groups and to learn more about the biomechanics of their defense mechanisms. She is currently investigating the mechanics of puffer fish inflation and studying how their skin stretches. Among her findings to date is documentation that puffers' mouths function as pumps to force water into their stomachs at a rate of three puffs per second.

Alan Launer, presently working on his Ph.D. thesis at Stanford, is investigating development in feeding mechanisms of freshwater sunfishes. Launer's approach is from an ecological perspective and he is specifically interested in community structure. He documents feeding at various developmental stages from larval to adult with the use of high-speed video equipment. This type of study has only become possible with the advent of high speed video technology because the heat generated by the light required for the older method of high speed filming could not be tolerated by the small fishes. One of the aspects Launer is looking at is the "ontogenetic niche shift," or the ability of juveniles and adults at different stages in development to co-exist in the same area utilize different resources.



Spiny pufferfish Diodon holocanthus *before . . .*



and after inflation

Horacio Higuchi, a nocturnal polyglot, is working on the anatomy and relationship between groups of a neotropical catfish family. He is currently redescribing a species that was known for the last hundred years from only a single specimen, and describing a closely related new species. Higuchi is from Brazil where he completed his masters thesis on several south Atlantic sea catfishes.

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Fossil Hunting in Greenland

This past summer while some of us sweltered in the oppressive Cambridge heat, Farish A. Jenkins, Jr., Charles R. Schaff, William A. Amaral of the MCZ Vertebrate Paleontology Department and Neil Shubin, 1987 Harvard Ph.D. now at Berkeley mounted their first fossil-finding expedition to the rugged landscapes of eastern Greenland.

Photo by Charles R. Schaff

Looking for fossils in Greenland are (l. to r.) Neil Shubin, Farish Jenkins, and Bill Amaral.

Photo by Farish Jenkins

Charles Schaff encases the dinosaur find in plaster for safe transport to the lab.

The project was designed to explore various formations of the Scoresby Land Group, a cluster of strata in eastern Greenland, for fossil vertebrates and other evidence relating to the evolutionary transition in land animals that took place approximately 200 million years ago during the Late Triassic through Early Jurassic times. Funded by a grant from the National Science Foundation, paleontological reconnaissance was undertaken from four base camps.

The choice of this isolated location was based on the geological age (the transition from Triassic to Jurassic) of exposed outcrops of rock previously only known through an extensive sedimentological and stratigraphic analysis by Danish geologists.

The team embarked on the 31-day expedition on June 30 with 2,000 pounds of camping gear, collecting equipment and freeze-dried food needed for a month in the Artic wilderness. With the exception of helicopter assistance while moving camp, their only outside contact was by two-way radio. Armed with picks, chisels, hammers, brushes, plaster bandages and other tools of the trade. They endured the highly variable climate and scored the bleak landscape for fossils. Their search was modestly successful than anticipated turning up fossil evidence of dinosaurs, reptiles, amphibians, and fish.

Perhaps their most interesting find was what it believed to represent a turtle. If this is confirmed through further preparation, the specimen may be an extremely important addition to our knowledge of turtle evolution. The origin of Chelonia is at present an unresolved problem. Turtles appear in the fossil record some 180 million years ago, which is approximately the age of this newly discovered specimen.

Photo by Charles R. Schaff

Part of a dinosaur pelvis from the Greenland expedition.

Science Kits for Somerville

by Arlene Nichols, Education Director

Arlene Nichols (l.) and Wini Eisan and the Somerville science-teaching kits.

Within the microcosm of the MCZ there appears to be no shortage of people who view the world in a rational scientific manner. Recent surveys by the National Science Foundation and the Science and Technology Coalition as well as reports from the Department of Education, however, indicate that the public at large has little understanding of the laws which govern our world. Moreover, there is a growing problem of science illiteracy because fewer students are choosing science courses.

The MCZ's Public Education Department emphasizes programs for elementary schools because I believe that children can be "hooked" on science and encouraged to elect more science courses if early in life, they have the opportunity to experience that science is an exciting way of thinking.

This year Program Developer Wini Eisan and I have responded to the primary grade teachers' strongly-held belief that there is not enough time for science because they must teach reading and other language arts. We have developed a kit that integrates appropriate science skill development with language arts. The kits include equipment ranging from supplementary readers, mini-aquaria and hand lenses to artifacts such as animal skins, jaw bones and teeth, shells, feathers, and much more to stimulate hands-on science activities.

The Somerville Public Schools contracted for 25 kits, one for each first grade teacher. The teachers' manuals key the activities directly to Somerville basic readers to insure that the materials are used. In mid-November the presentation of the Science and Language Arts Box (SALAB), the kit's official name, to the first-grade teachers at a city-wide workshop was met with gratifying responses. The ultimate evidence of its success will be the degree of use but one immediate result is that Wayne Legue, elementary curriculum coordinator for the Somerville Public Schools, has requested the creation of 10 more kits for the bilingual teachers.

We believe that the answer to more and better science teaching lies in listening to the needs of the elementary school teachers. The MCZ Public Education Department is dedicated to serving as a resource to the public school educators of our community.

Staff Notes

MCZ Director **James J. McCarthy** is one of twelve Phi Beta Kappa Visiting Scholars this year. Chapters of Phi Beta Kappa invite a visiting scholar to meet with students and give a public lecture. McCarthy is scheduled to visit seven colleges where he is speaking about his research related to the eddies in the Gulf Stream, the role of plankton in the carbon cycle, and the status of the International Global Change program. He is enjoying the opportunity to meet undergraduates from other colleges (including Albion, Purdue, Ohio State) and to talk with them about graduate research opportunities in evolutionary biology and oceanography.

New exhibit: *Diversity Endangered*

Photo by Robert Goldstrom; courtesy of SITES.

An artist's depiction of the interrelated worlds of species and habitats.

The MCZ has acquired a poster exhibition created by SITES (Smithsonian Institution Traveling Exhibition Service) depicting, in vivid photos and text, the threat to many life forms caused by such abuses as acid rain, strip mining, deforestation, and air and water pollution. A videotape accompanies the exhibit which will be in the MCZ Gallery through February.

Pheasants Under New Glass

*by Rolanda Ritzman, Editor, OEBserver**

The MCZ's George Washington pheasants, among the oldest taxidermic specimens in the country, have been moved into a large, portable case, thanks to a grant from the Institute of Museum Services. "There is a growing awareness of the importance of collections, with animals becoming rare, endangered, or extinct, so funding agencies that have traditionally given to art museums for conservation are giving funds to preserve natural history collections," said Ed Haack, MCZ Exhibits Director.

The new scratch-resistant acrylic case uses incandescent lighting instead of fluorescent to protect the birds from light degradation. The iron base, custom-made by a Vermont blacksmith, conceals a thermometer and a hygrometer to measure temperature and humidity, and silica gel to adjust the humidity level at the optimum 50%. Exhibits Assistant Bob Davidson constructed the wood work and base and Kathy Brown-Wing drew Mount Vernon directly on to the backboard.

The Chinese gold pheasants were a gift to George Washington from the Marquis de Lafayette in 1786. Shortly after acquiring them, Washington received a request for the birds upon their death from Charles W. Peale for his museum in Philadelphia. They were added to the Peale museum in 1787 and became part of Harvard's collections in 1914.

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